IN THE CLAIMS:

Please cancel claims 2, 7, 8, 11, 12, and 14–30, amend claims 1, 3–6, 9, 10, and 13, and add new claims 31–36 as follows:

1. (Currently Amended) A method for processing an image using a bilateral filter, comprising the steps of:

generating a modified bilateral filter by reformulating an initial bilateral filter for each pixel location in the image into a sum of the original signal value of a central pixel at said pixel location and a bilateral correction term which is a function of local signal differences between the central pixel and its neighbors; ~~and~~

~~processing the image using the modified bilateral filter to generate a filtered output~~

processing each pixel (i) in the image by:

buffering a neighborhood of said pixels as determined by the size of the bilateral filter convolution kernel Kj; and

calculating a filtered value for said pixel (i) using a bilateral filter including a normalization expression implemented as a Taylor series expansion;

replacing the normalization expression with a value of 1;

for each possible quantized said signal difference:

pre-calculating the product of the photometric weight for each neighboring pixel j and the signal difference Δf_j between pixel j and center pixel i, to produce a signal value PSI(Δf_j) representing the influence of neighboring pixel j;

storing each said value of PSI in a look-up table; and

using a value of PSI in the look-up table corresponding to an instant value of Δf_j to calculate the contribution of the neighboring pixel j, by multiplying the value for pixel j with a corresponding convolution kernel coefficient K_j.

2. (Cancelled)

3. (Currently Amended) The method of claim ~~2~~ 1, wherein said Taylor series expansion is implemented as a truncated infinite geometric sum.

4. (Currently Amended) The method of claim ~~2~~ 1, wherein said Taylor series is implemented using an order of expansion of zero.

5. (Currently Amended) The method of claim ~~2~~ 1, wherein the Taylor series is expanded as a truncated infinite product.

6. (Currently Amended) The method of claim ~~2~~ 3, wherein said truncated infinite geometric sum having an order of expansion of one is used to implement a signal processing device operating in accordance with said method.

7.-8. (Cancelled)

9. (Currently Amended) ~~The method of claim 2~~ A method for processing an image using a bilateral filter, comprising the steps of:

generating a modified bilateral filter by reformulating an initial bilateral filter for each pixel location in the image into a sum of the original signal value of a central pixel at said pixel location and a bilateral correction term which is a function of local signal differences between the central pixel and its neighbors; and

processing each pixel (i) in the image by:

buffering a neighborhood of said pixels as determined by the size of the bilateral filter convolution kernel Kj; and

calculating a filtered value for said pixel (i) using a bilateral filter including a normalization expression implemented as a Taylor series expansion;

wherein the normalization expression is expanded by performing the additional steps of:

for each possible quantized said signal difference Δf_j:

pre-calculating the photometric weight $g(\Delta f_j)$;

storing each said value of photometric weight in a look-up table; and

using a value of g in the look-up table corresponding to an instant value of a signal difference in one or more color-channels Δf_j to compute the bilateral weight of a neighboring pixel j, by multiplying the value for pixel j with a corresponding convolution kernel coefficient K_j;

computing a bilateral correction term for each of the color channels, by multiplying the calculated bilateral weight of the neighboring pixel j with the signal differences Δc_j corresponding to each of the color channels; and

adding each of the computed bilateral correction terms to the central pixel value for the corresponding channel.

10. (Currently Amended) A method for generating a zero-order approximation of a bilateral filter, wherein a single channel input signal including an image comprising a plurality of pixels is filtered to provide a single channel output corresponding to one dimension of a filtered image, the method comprising the steps of:

summing, for all said pixels i in the image, contributions from each neighboring pixel j, corresponding to K_j, wherein the contribution of each said neighboring pixel j is:

(a) the photometric weight for each said neighboring pixel j, multiplied by

(b) the signal difference between pixel j and the center pixel single channel signal; multiplied by

(c) the convolution kernel coefficient K_j for the neighboring pixel (j); and

adding the single channel center pixel signal to generate the single channel output for the center pixel;

wherein said photometric weight for neighboring pixel j is determined by the difference between the center pixel signal and the signal at the neighboring pixel j, corresponding to K_j; and

wherein the convolution kernel coefficient K_j is a weight that determines the contribution of neighbor j to a weighted average filter;

quantizing the input signal;

for each possible quantized said signal difference:

pre-calculating the product of the photometric weight for each neighboring pixel j and the signal difference Δf_j between pixel j and center pixel i, to produce a signal value PSI(Δf_j) representing the influence of neighboring pixel j;

storing each said value of PSI in a look-up table; and

using the value of PSI in the look-up table corresponding to an instant value of Δf_j to calculate the contribution of the neighboring pixel j, by multiplying the value for pixel j with a corresponding convolution kernel coefficient K_j.

11-12. (Cancelled)

13. (Currently Amended) A system for processing an image including a plurality of pixels comprising:

a look-up table stored in said memory, and a bit-shift register

a processor and associated memory;

a bilateral filter program, stored in said memory and executable by said processor;

wherein the bilateral filter program processes each pixel (i) in the image by:

reformulating the bilateral filter, for each pixel location in the image, into a sum of the original signal value of a central pixel at said pixel location and a bilateral correction term which is a function of local signal differences between the central pixel and its neighbors;

buffering a neighborhood of said pixels as determined by the size of the bilateral filter convolution kernel Kj; and

calculating a filtered value for said pixel (i) using a bilateral filter including a normalization expression implemented as a truncated Taylor series expansion;

wherein the normalization expression is expanded using a Taylor series expansion by performing the additional steps of:

for each possible quantized said signal difference:

pre-calculating the product of the photometric weight for each neighboring pixel j and the signal difference Δf_j between pixel j and center pixel i, to produce a signal value $PSI(\Delta f_j)$ representing the influence of neighboring pixel j;

storing each said value of PSI in the look-up table; and

using a value of PSI in the look-up table corresponding to an instant value of Δf_j to calculate the contribution of the neighboring pixel j, by multiplying the value for pixel j with

a corresponding convolution kernel coefficient K_j;

wherein the normalization expression is implemented using the bit-shift register.

14–30. (Cancelled)

31. (New) A method for processing an image using a bilateral filter, comprising the steps of:

generating a modified bilateral filter by reformulating an initial bilateral filter for each pixel location in the image into a sum of the original signal value of a central pixel at said pixel location and a bilateral correction term which is a function of local signal differences between the central pixel and its neighbors;

processing the image using the modified bilateral filter to generate a filtered output; and

processing each pixel (i) in the image by:

buffering a neighborhood of said pixels as determined by the size of the bilateral filter convolution kernel Kj; and

calculating a filtered value for said pixel (i) using a bilateral filter including a normalization expression implemented as a Taylor series expansion.

32. (New) The method of claim 31, wherein the normalization expression is expanded by performing the additional steps of:

for each possible quantized said signal difference Δf_j:

pre-calculating the photometric weight $g(\Delta f_j)$;

storing each said value of photometric weight in a look-up table; and

using a value of g in the look-up table corresponding to an instant value of a signal difference in one or more color-channels Δf_j to compute the bilateral weight of a

neighboring pixel j, by multiplying the value for pixel j with a corresponding convolution kernel coefficient K_j;

computing a bilateral correction term for each of the color channels, by multiplying the calculated bilateral weight of the neighboring pixel j with the signal differences Δc_j corresponding to each of the color channels; and

adding each of the computed bilateral correction terms to the central pixel value for the corresponding channel.

33. (New) The method of claim 31, wherein said Taylor series expansion is implemented as a truncated infinite geometric sum.

34. (New) The method of claim 31, wherein said Taylor series is implemented using an order of expansion of zero.

35. (New) The method of claim 31, wherein the Taylor series is expanded as a truncated infinite product.

36. (New) The method of claim 31, including the additional steps of:

replacing the normalization expression with a value of 1;

for each possible quantized said signal difference:

pre-calculating the product of the photometric weight for each neighboring pixel j and the signal difference Δf_j between pixel j and center pixel i, to produce a signal value PSI(Δf_j) representing the influence of neighboring pixel j;

storing each said value of PSI in a look-up table; and

using a value of PSI in the look-up table corresponding to an instant value of Δf_j to calculate the contribution of the neighboring pixel j, by multiplying the value for

pixel j with a corresponding convolution kernel coefficient K_j.